ART METAL CRAFT

SHAPING
MODELING
PIERCING
STAMPING
ETCHING
COLORING

PEDRO J. LEMOS

SCHOOL ARTS MAGAZINE
WORCESTER-MASS

Copyright 1937
THE DAVIS PRESS, INC.
Worcester, Mass., U. S. A.

No. 202 . . . Price $2.00

Working Instructions for Art Metal

Art metal craft may become as intricate as one may wish, involving much detail and complicated equipment, but the purpose of this portfolio is to propose a number of handicrafts done with simple forms and therefore requiring but a few tools. After all, the most beautiful handicraft and most practical, is that which is simplest, and such product is encouraged by tools that will not permit elaboration of form and detail, so let us decide that the limited equipment of fewer tools is a desirable limitation after all.

CUT-OUTS AND APPLIQUE. A form of decorative metal craft used in Europe and the Orient is the applying of applique of metal forms to wooden shapes such as boxes, screens, bowls, frames, doors, posts and other wooden forms. Patterns of the metal shapes may first be planned on paper and cut out to be used as guides for outlines on the metal. The metal shapes are then cut out with metal shears and fastened in place on the wooden object with small tacks or escutcheon nails. The metal forms may be brass, copper, pewter, zinc, or aluminum, and these may be used combined in designs for varied metalic color effects, or one metal only used on an object. The metal forms may be modeled a little by the use of the ball part of a pin-hammer, laying the metal reverse side upward on a block of wood and slightly hammering it.

A light rubbing of the metal forms with fine steel wool after they have been fastened to the wood surface produces a pleasing quality. A little beeswaxing with a cloth finishes it.

STAMPED and INCISED METAL. With a few metal tools filed to produce simple patterns such as a point, a ring, a triangle, short dash and long line, a great variety of pattern may be produced in stamping these onto the metal surfaces. Simple metal tools or nails may be used, such as carpenter's nail sets, or small cold chisels. Large nails may be ground on carborundum stones and a few file marks will produce many designs for such use.

The metal surface should be cleaned with steel wool or with damp cloth and whiting and the design idea sketched with a grease pencil or transferred from paper to the metal with carbon paper. The metal is then placed upon a wooden board or on a metal base and the tool with the selected shape is struck with a hammer to indent the pattern. The metal is then straightened out by striking the reverse side of the metal with a mallet.

Such incised or stamped designs, when done on thin metal, may be used with the reverse side as the right side, as the indentation will be sufficiently marked through the thin metal. This is often used on decorative tin for lamps, sconces and metal frames.

TOOLING, REPOUSEÉ and COLORING. Many objects may be decorated with tooled metal. The metal of any type should be paper-thin and placed on a cardboard or heavy blotter. A dull-pointed nail, leather tool, nut pick, or similar point is used to press down the lines necessary to produce the design. A double line around every motif results in a series of depressions that may be used to hold color paint to add brilliancy to the finished object. The paint for such purpose may be enamel lacquers which dry with a glaze and adhere firmly to metal. The color enamel lacquer may be used in thin coats or dripped into the spaces holding the brush upright. The metal should be left to dry in a flat position to avoid having the color run before it is dry.

Repouseé or embossing may be done in several ways. A pan of pitch may be used in which to place the sheet metal. The tools are tapped with a hammer and the indentation goes into the pitch underneath. When the embossing is done on one side the metal surface may be reversed and the opposite side further modeled by using the tools again. A piece of linoleum or sheet of thick lead may also be used for the same purpose and will serve if a high relief is not needed.

PIERCING and SAWING. Cut patterns in metal may be produced by drilling, by drilling and filing, or by drilling and cutting varied shaped openings with a metal saw. Designs with drills may be secured by drilling the holes in design arrangement, perhaps using different sized drills. Files may be used to shape the round drill holes into triangles, squares or other shapes. The edges of these openings may afterwards be smoothed with emery paper or with finer files.

To saw the patterns, a hole is first drilled. The saw is adjusted through the hole and the metal rested on a thin wood support as illustrated in one of the portfolio plates. The teeth of the saw should point outward and downward. To avoid breaking the saw do not force the saw or jerk it. The saw should not be coarse or loose in its position. A little beeswax rubbed on the saw teeth will help smooth sawing. The outline of the finished opening may always be corrected with a little careful filing. Cutting or shaping of outside lines of metal may be done by locking the metal in a vise and using metal shears or a hack saw. Then metal may be shaped with lighter metal shears.

METAL ETCHING. All the metals may be etched by covering the metal with asphaltum varnish leaving only those parts exposed that are to be etched. The back and edges should also be covered with the asphaltum to prevent etching the surfaces. This plate or metal is placed in the etching bath face up. The bath is composed of a third part nitric acid poured slowly into a porcelain or enameled pan containing two-thirds part water. This is left until etched sufficiently deep, after which it is removed, dried and then gasoline poured onto the asphaltum to soften it for removal with a cloth. During the etching if the tray is placed crossways on a stick so it can be rocked carefully up and down the acid bath will etch the exposed metal more rapidly. Perchloride of iron solution as an etching solution is explained in one of the plates. A strong feather is a good acid brush to pass over the plate surface to remove bubbles in nitric acid etching and to remove the accumulated surface scum from the copper in perchloride etching. Perchloride etching will also be found to be more dependable for etching aluminum.

When deep etching is desired on metal, the plate should be removed after it has etched about a card thickness and dried. Then resinous powder (engraver's dragon blood) is brushed over one direction of the

Craft . . . by Pedro J. Lemos

plate. This causes the powder to bank against all exposed edges of one direction of the plate. The plate is then held over a gas flame until the powder is melted in. The plate is cooled, dried, and powdered and brushed again with powder from the next direction of the plate, the brushing done four times across the four compass points of the plate so as to protect all etched shoulders of exposed parts. The plate can then be placed in the acid again and etched more deeply. This operation may be repeated until the needed depth is reached.

BOWL SHAPES. Many forms of bowls, vases and trays may be made by the use of hollowed spaces in logs, blocks of wood, using varying shaped hammers. As the shaping proceeds copper will become hardened and brittle and it is necessary to anneal it before hammering may continue. The annealing is done by heating the copper to almost cherry red and then dipping it in water which softens the metal for further shaping. Other flat tray shapes may be easily done by cutting wood forms or shaping spaces by nailing wood strips so that the metal can be depressed along the wood edges. Or the metal can be locked between wood strips in a vise and the parts depressed by using a hammer to strike the ball part of a machinist's hammer along a given edge.

SURFACING and COLORING. Many metal forms finished with the heavy hammer marks showing give a rustic, peasant type quality of handicraft. This rough quality must be carefully accomplished and thoughtfully done, not carelessly. To give a planished surface a smooth surfaced hammer is used to go over the entire surface while the bowl surface rests over an iron ball or other tool surface held firmly in the vise. The hammer blows may be slowly done so as to fall next to each other, or the marks may come irregularly until the entire surface is covered.

The plate on cut-out metal craft gives several formulas for coloring metal. The craftsman should make it a rule to always pour the chemical used into the water and not the water into chemical, and also never to pour water containing acids into any sink or down plumbing drains if trouble is to be avoided. To these metal color recipes may be added another. Taking "ruttle" (an iron oxide), make a paste with water. Brush this over the finished copper and dry thoroughly and burn over a flame until it is darkened. Then dipping a flannel cloth into graphite dust and then onto beeswax polish the copper surface, repeating the graphite and beeswax as needed. This is a method centuries old, used in the copper-using country of Holland.

SOLDERING. The most essential things in soldering are a good hot soldering iron and clean surfaces to be soldered; but one must have also his solder and the "flux," or material which makes the solder stick to the work. This flux may be any one of several different kinds such as, solder paste, resin, muriatic acid, which must be cut by placing strips of zinc in it and permitting it to boil until the zinc is entirely dissolved. Continue putting the strips in it until the last one boils just slightly. This solution must not come in contact with clothing or anything but the work being used, as it will eat holes in cloth and destroy things in general.

A good iron is most essential for satisfactory results. The old-fashioned irons are good, but they have to be heated by placing in red-hot coals or by a blow torch or over a gas plate. The electric iron is lighter and easier to handle but not always available. However, in these days of the ten-cent-stores good irons can be purchased for as low as fifty cents for a 75-watt type. I would not recommend anything less than a 75-watt as that has plenty of heat to work with.

There are different types of points to be used on these "irons-coppers," by right usage, but we will use the word "iron," as it is more common. Either a pointed or a flat iron may be used, but many prefer the flat type, as it imparts more heat to the work. Any soldering iron must be "tinned" or it will not work at all, and to do this the surface of the points must be filed bright and clean, then heated until almost red hot. Next, scrape up a little "paste" on the end of the solder wire and rub over the surfaces to be tinned. If it does not take, file a little and try it over. If you have some salamoniac, heat the iron and then rub it on the salamoniac and add a little solder to the point, seeing that it spreads over the entire point.

There are several types of material that can easily be soldered, such as brass, copper, tin, gold, silver, or iron. Cast iron, or white metal, such as is used in plumbing fixtures, or aluminum, cannot be soldered. There is a special kind of solder used for aluminum. Iron and copper are the most difficult to solder, but with practice very neat work can be done even with iron. Copper is difficult because if it is over-heated it will not take, or if it has not been throughly cleaned it will not take. It takes more care and patience than either brass or tin.

The articles to be soldered must be thoroughly cleaned either by scraping or sandpapering until the parts are bright. Solder will not stick to dirt. Hold the parts tightly together, or if they have a tendency to spring apart, clamp them together. Then hold the iron so it will impart a maximum amount of heat to the work. When it is thoroughly heated then apply the flux either by dipping the wire solder into the flux or by the use of a match stick. Do not use too much flux, just sufficient to do the work. When the flux is on, hold the solder in such a way that it will flow from the iron to the work and not back up on the iron. Your work will look much neater if the solder is flowed on smoothly and not put on in bunches to be cut or scraped away later. Also, it takes less solder when flowed on.

It takes practice to do a nice looking piece of work, and some pieces will require patience also. When the work is finished take a piece of cotton cloth that is not too "linty" and dip it in a little alcohol or gasoline and wipe off the surplus flux or acid.

As a flux, resin core works fairly well with brass, tin or silver, but not so well with other materials. Muriatic acid is the best for iron work. The latter must be thoroughly cleaned off or it will corrode and turn green in time. It also works best with all the other materials mentioned, but requires so much care in using that the average beginner should not attempt its use. A flux called "NOKORODE" will be found to be very satisfactory, and may be purchased at most hardware stores.

Art Metal Craft - Copyright 1937 by The Davis Press, Inc., Worcester, Mass. - Printed in U. S. A.

COPPER, BRASS, LEAD, AND TIN METAL CRAFT

Upper two examples show etched copper tray and tooled lead, the lead pattern filled with lacquer paint. The animal supports are cast lead. Below are shown a tin candlestick, a repoussé brass sconce, hammered copper bowl, pierced book support with glass insert and an etched and hammered book support.

(For methods, see Plates 3, 4, 5, and 8 and Tin Craft and Tooled Lead working sheet)

Art Metal Craft - Copyright 1937 by The Davis Press, Inc., Worcester, Mass. - Printed in U. S. A.

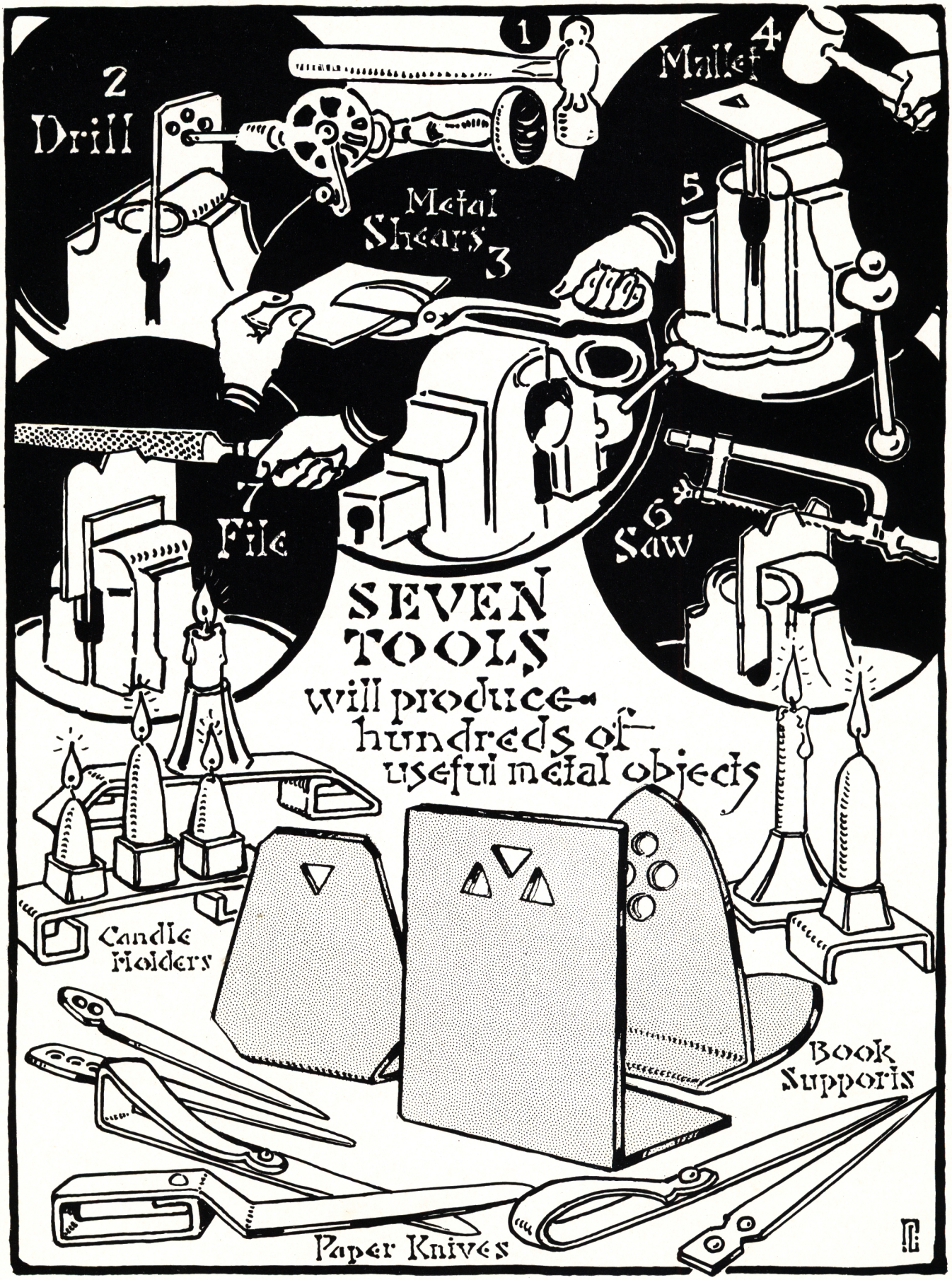


Plate 1

Seven simple tools and their uses in metal craft, together with suggested simple metal forms to be made with the seven tools, are illustrated above.

Art Metal Craft - Copyright 1937 by The Davis Press, Inc. Worcester, Mass. - Printed in U.S.A.

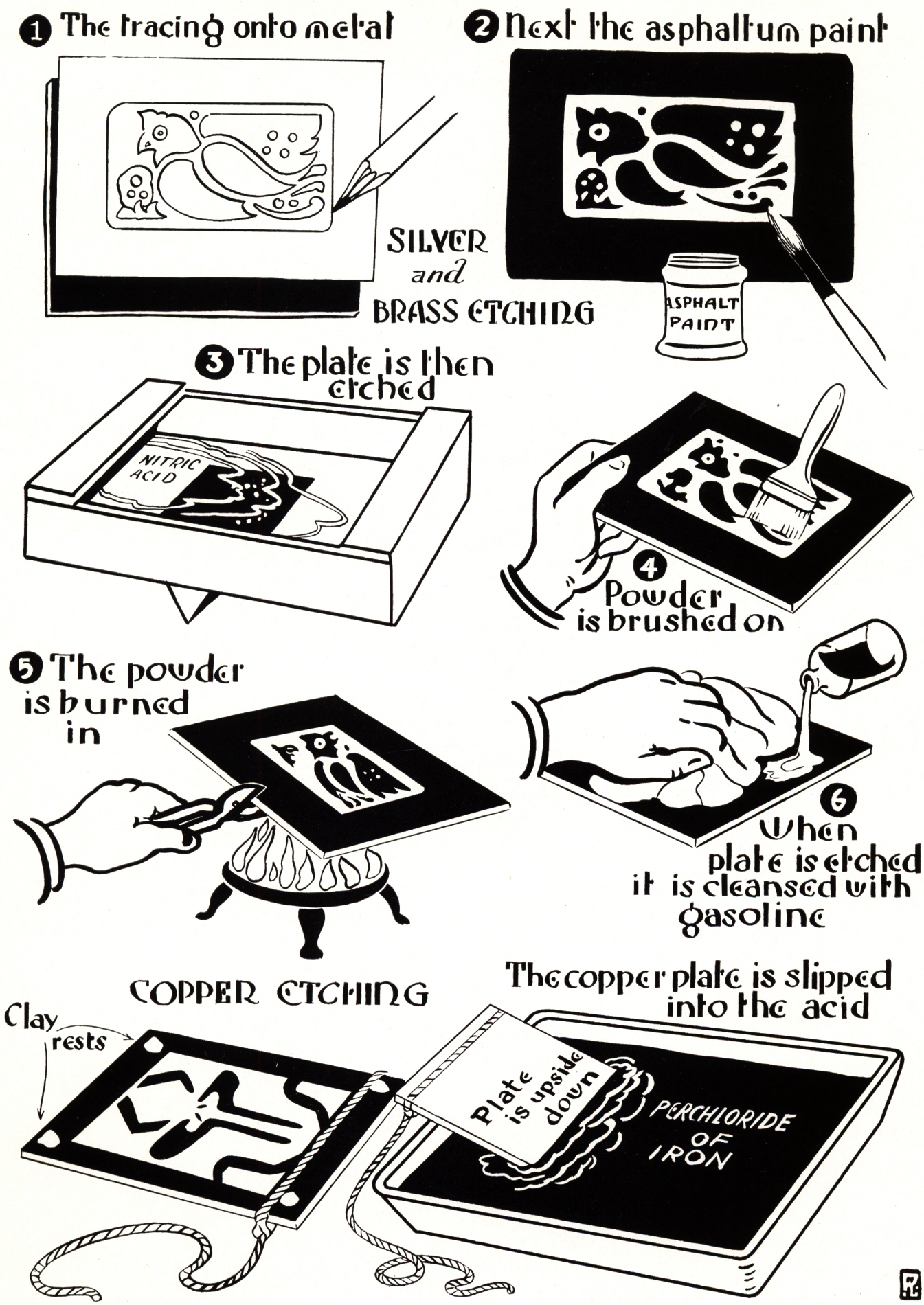


Plate 2

For deep etching of copper, brass, or pewter, zinc or iron the above process is used. Additional instruction is given in the inside cover descriptions.

Art Metal Craft - Copyright 1937 by The Davis Press, Inc., Worcester, Mass. - Printed in U. S. A.

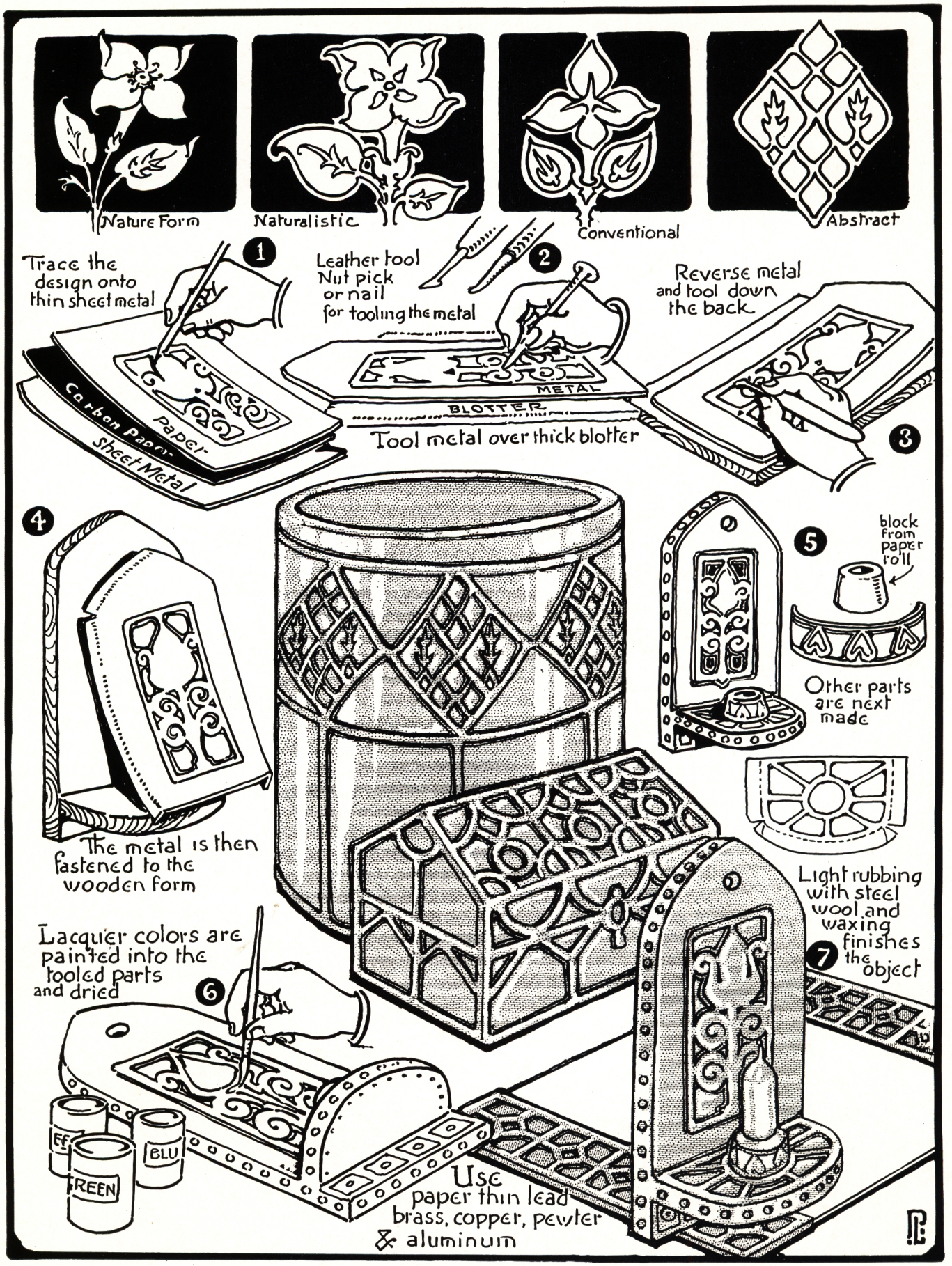


Plate 3

Thin metals placed over a semi-soft surface may be modeled in interesting reliefs by working on both sides. Sheet lead especially lends itself to this kind of tooling. Italian and English craftsmen do much of this art craft.

Art Metal Craft - Copyright 1937 by The Davis Press, Inc. - Worcester, Mass. - Printed in U. S. A.

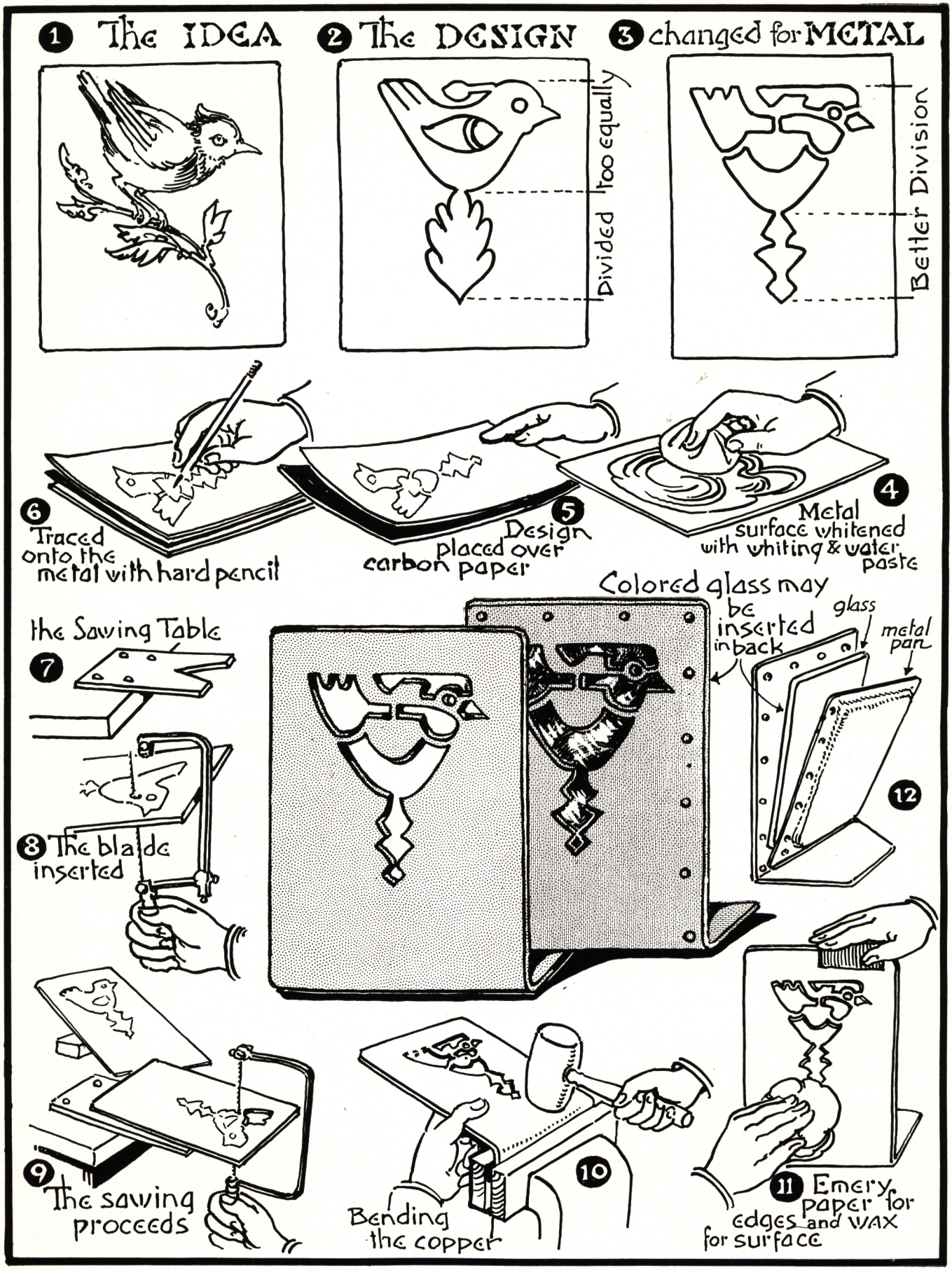


Plate 4

Preparing the design, transferring the design to the prepared metal surface, sawing the design through the metal, bending and finishing the copper handicraft is illustrated above.

Art Metal Craft - Copyright 1937 by The Davis Press, Inc., Worcester, Mass. - Printed in U. S. A.

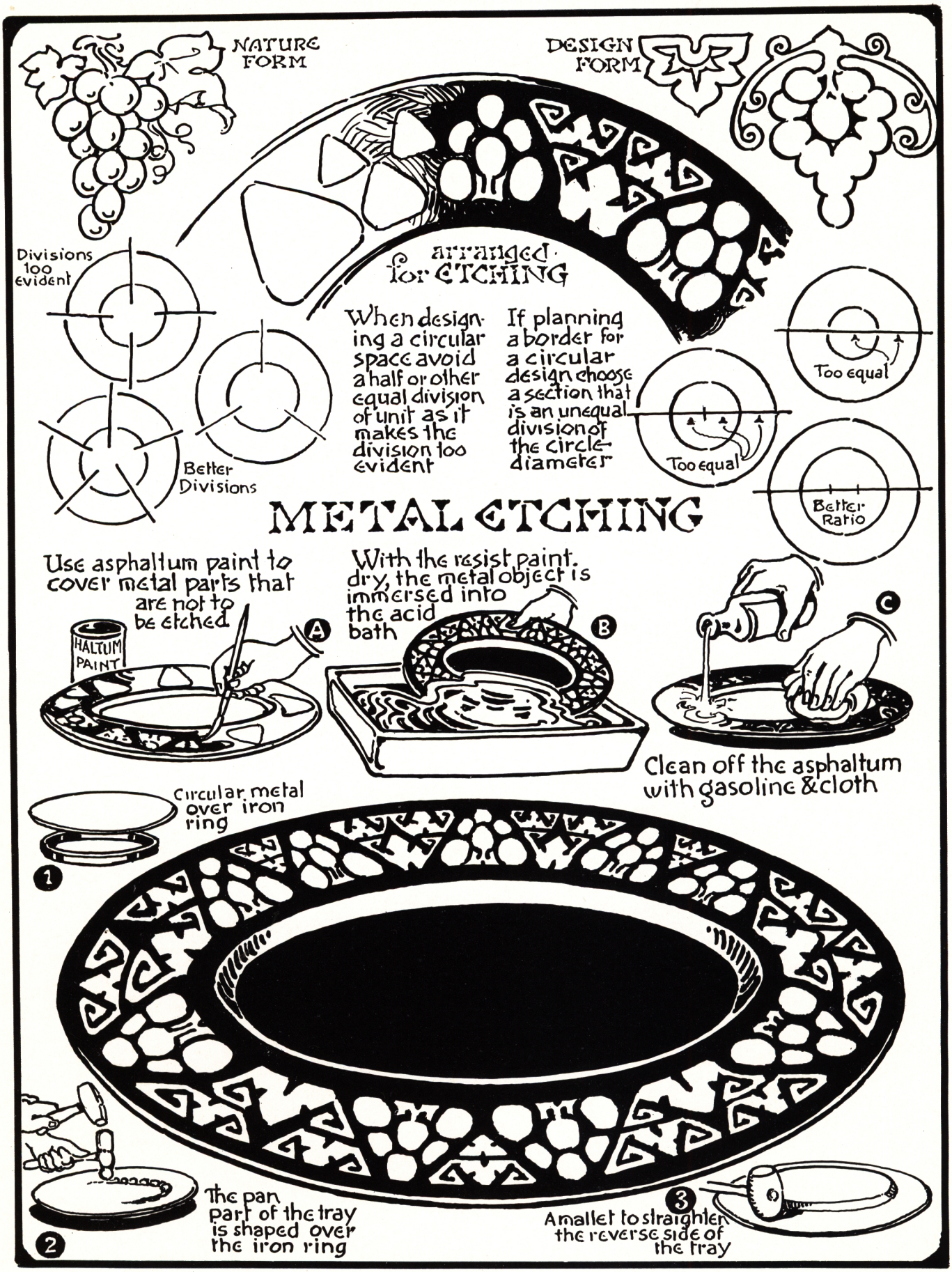


Plate 5

For etching zinc, pewter, aluminum and brass one-third nitric acid to two-thirds water is used. Never pour water into the acid. Pour the acid into the water slowly. When using nitric acid for etching copper, first put a small piece of copper into the nitric acid and permit it to dissolve.

Art Metal Craft. Copyright 1937 by The Davis Press, Inc. Worcester, Mass. - Printed in U. S. A.

Plate 6

Paper-thin copper, brass, pewter, aluminum or any metal craft sheet metal may be used for applique to wooden forms to make decorative handicraft. It is a craft much used in the Orient.

Art Metal Craft - Copyright 1937 by The Davis Press, Inc., Worcester, Mass. - Printed in U. S A.

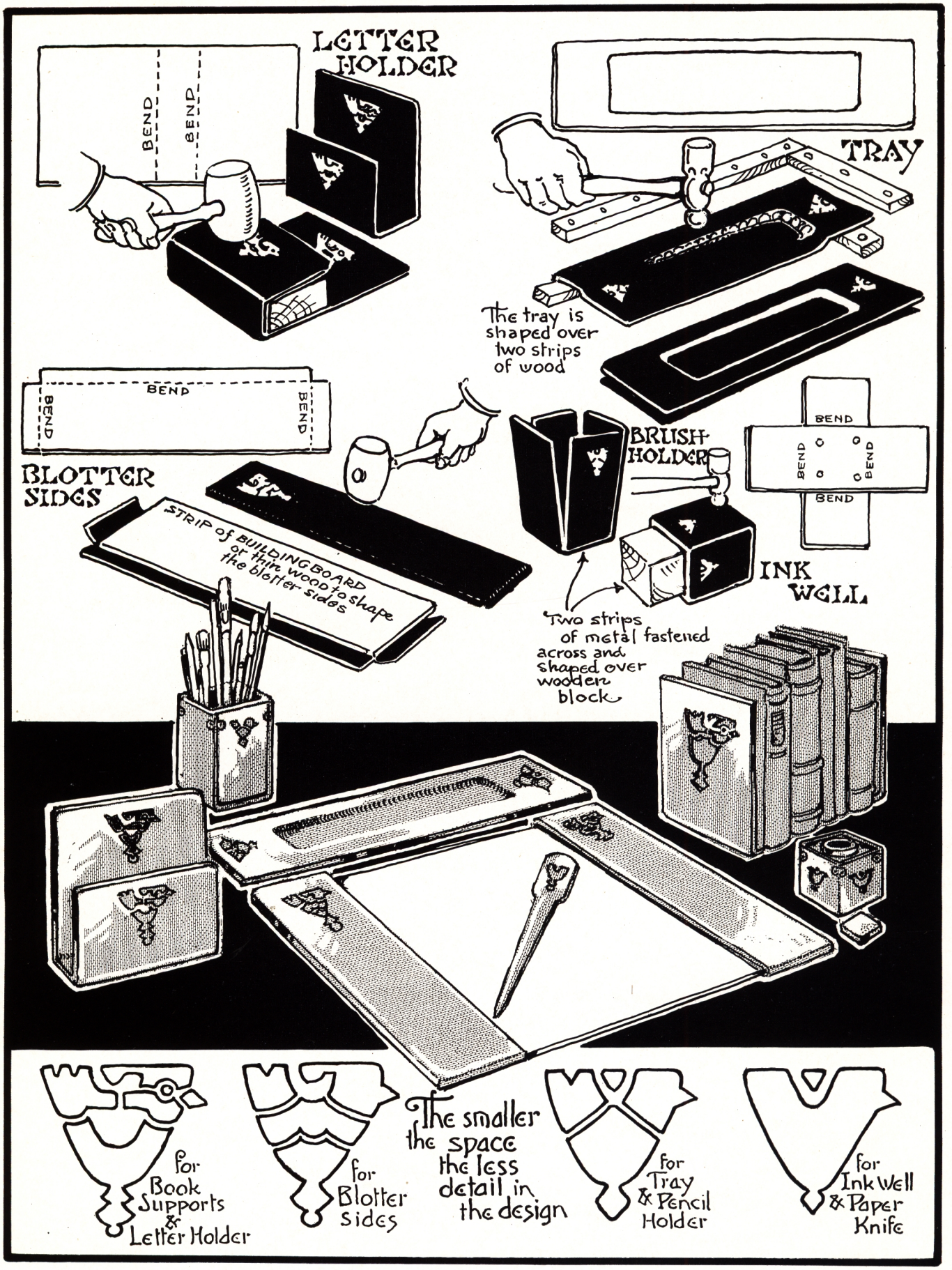


Plate 7

All parts of a copper made desk set may be made with simple tools as shown above. The motif used as a decoration should be simplified for smaller spaces as suggested on this plate.

Art Metal Craft - Copyright 1937 by The Davis Press, Inc., Worcester, Mass. - Printed in U. S. A.

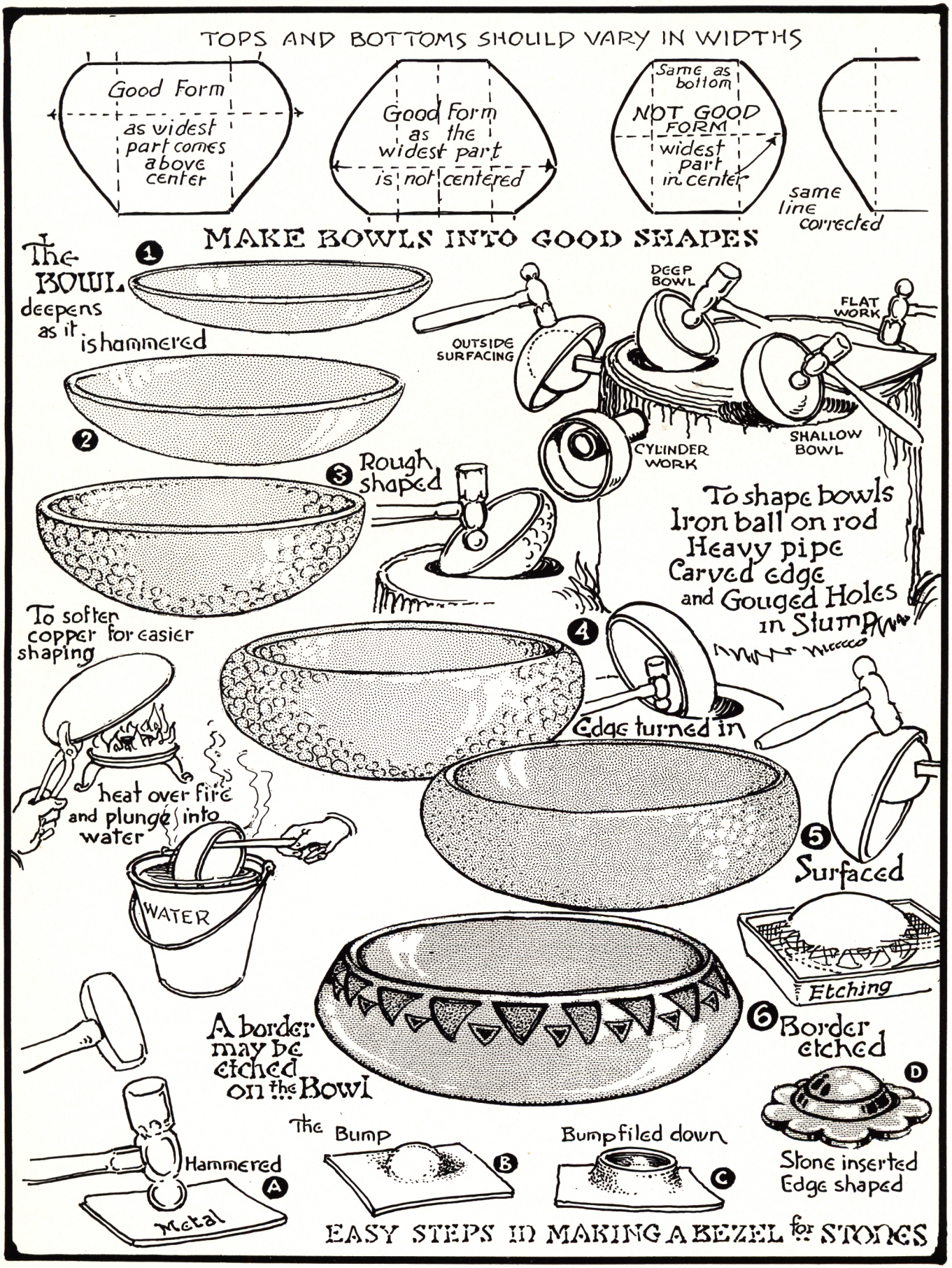


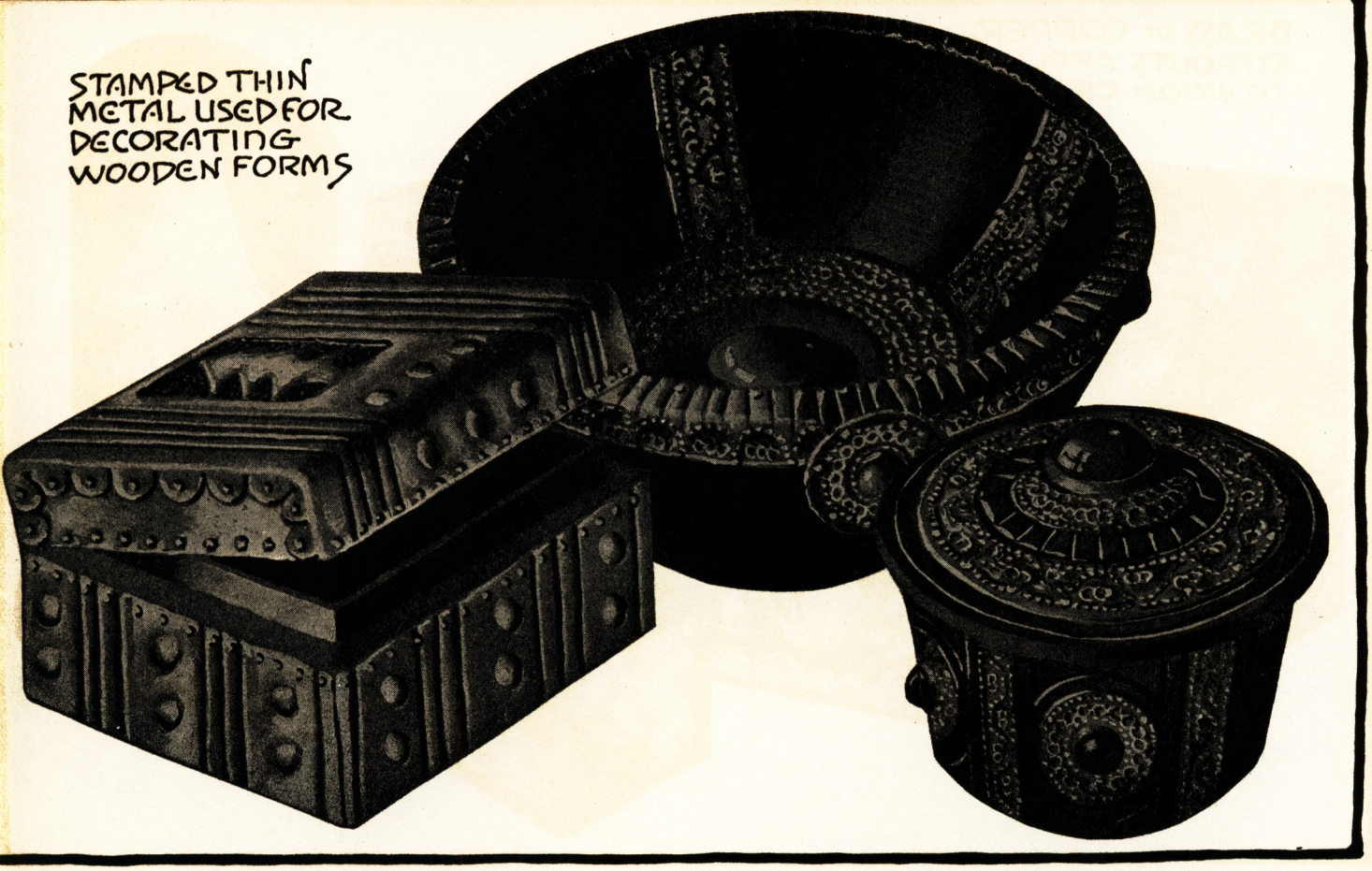
Plate 8

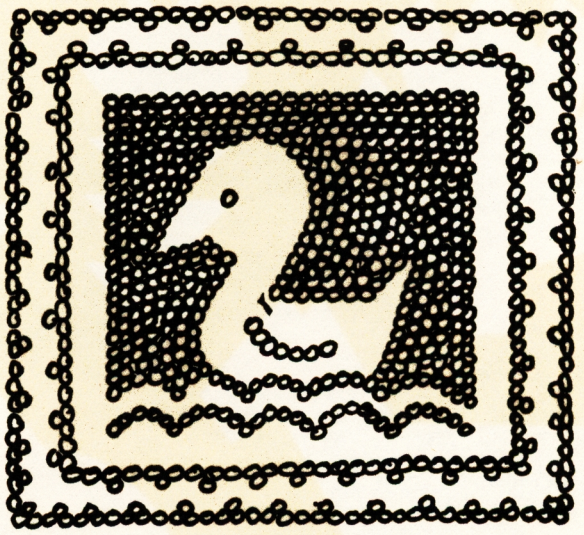
When the copper sheet becomes stiff from hammering, it should be annealed or softened. This is done by heating it over a flame until very hot and plunging it into the water.

Art Metal Craft - Copyright 1937 by The Davis Press, Inc., Worcester, Mass. - Printed in U. S. A.

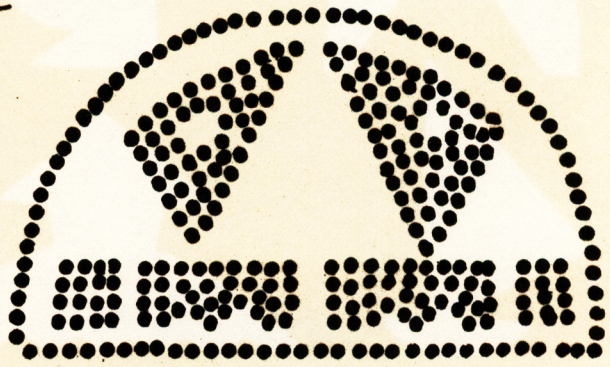
BRASS or COPPER
CUT-OUTS APPLIED
to WOOD CRAFTS

STAMPED THIN METAL USED FOR DECORATING WOODEN FORMS



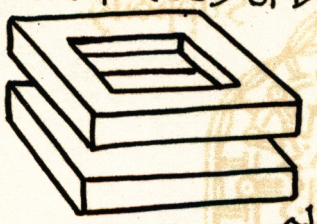


TYPES of DESIGNS ADAPTABLE to STAMPED METALWORK

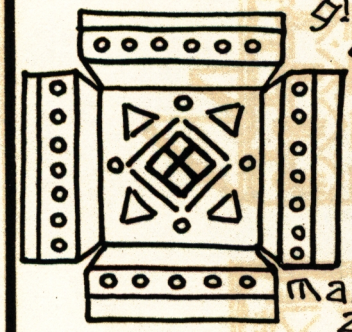


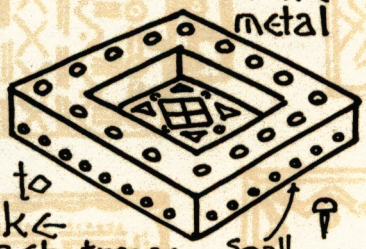
Art Metal Craft - Copyright 1937 by The Davis Press, Inc., Worcester, Mass. - Printed in U. S. A.

Two pieces of building board



glued together covered with thin metal

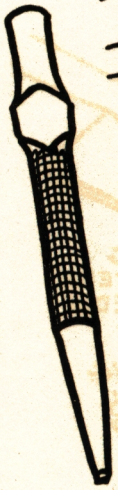


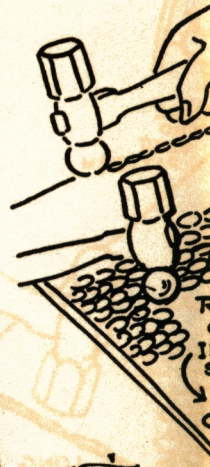


to make ash-trays

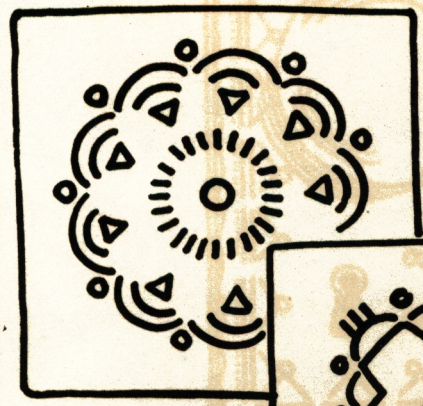
Small Tacks

15¢ Tools used for stamping patterns

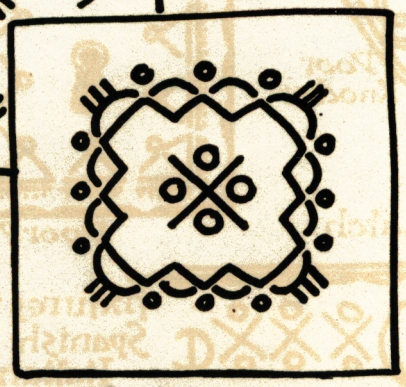




The meta be sur hel

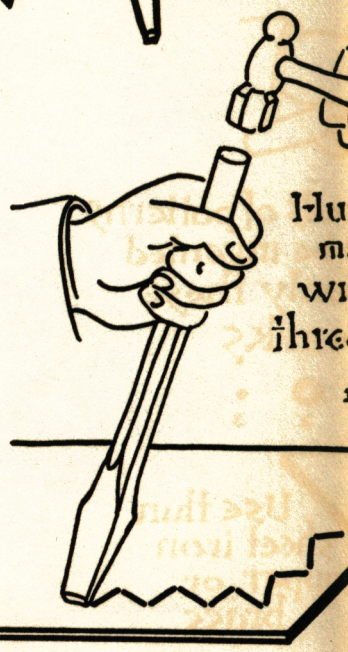


SHEET LEAD WORK



Designs tapped into lead sheets with nail, nail set or screw driver

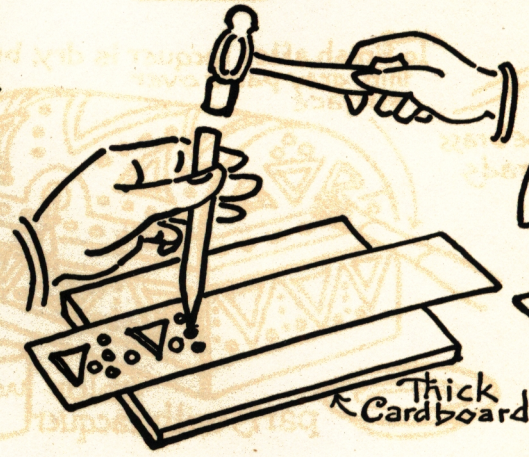
A FEW DESIGNS



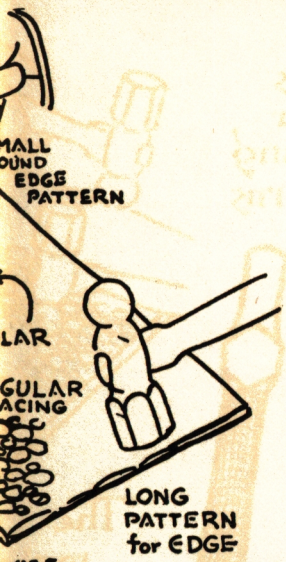
Hu m wi thre

Border designs

Designs may be stamped on both sides. It will produce two kinds of lines, one in relief and indented lines.



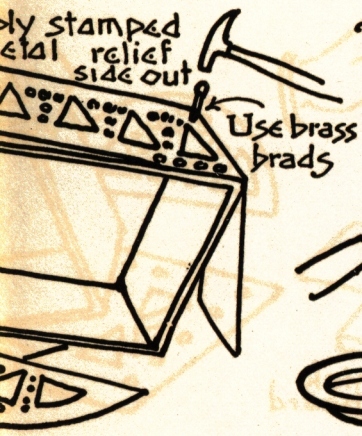
Thick Cardboard

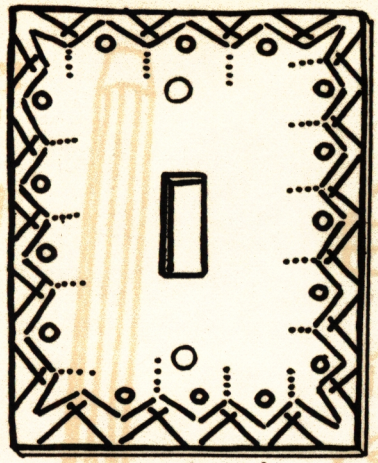


ay
ed as above
stamping

eds of patterns
be invented
only these
marks

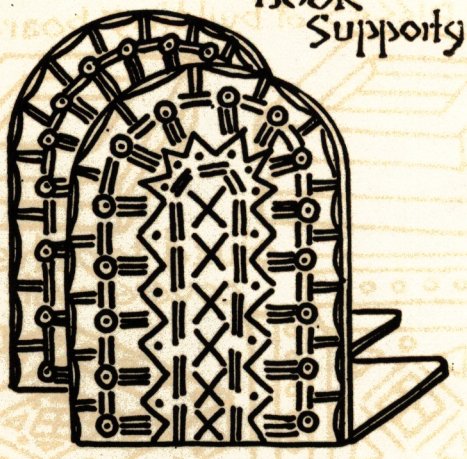
Use thin
sheet iron
opper or
brass



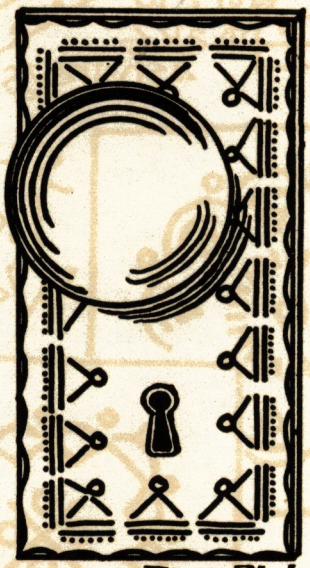


Light Switch

Book
Supports



Door
Knocker

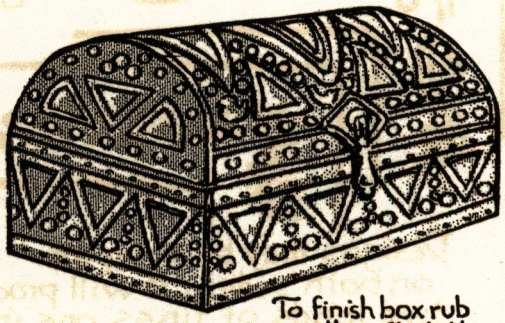


Door Plate

fixtures for
Spanish
Italian or
Brittany
type Homes

To finish after lacquer is dry, brush
thin gray paint over
surface

Color
parts with lacquer

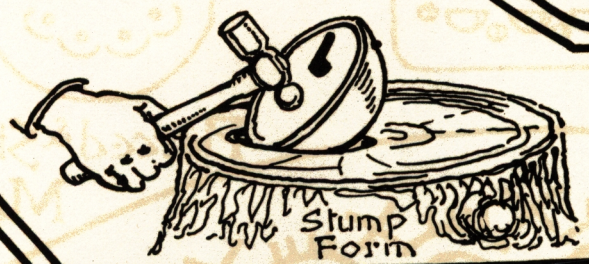


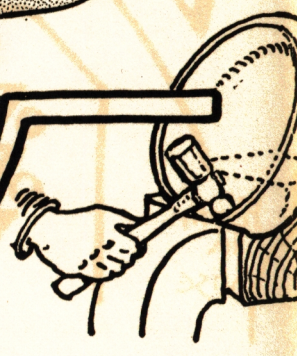
To finish box rub
with soft cloth

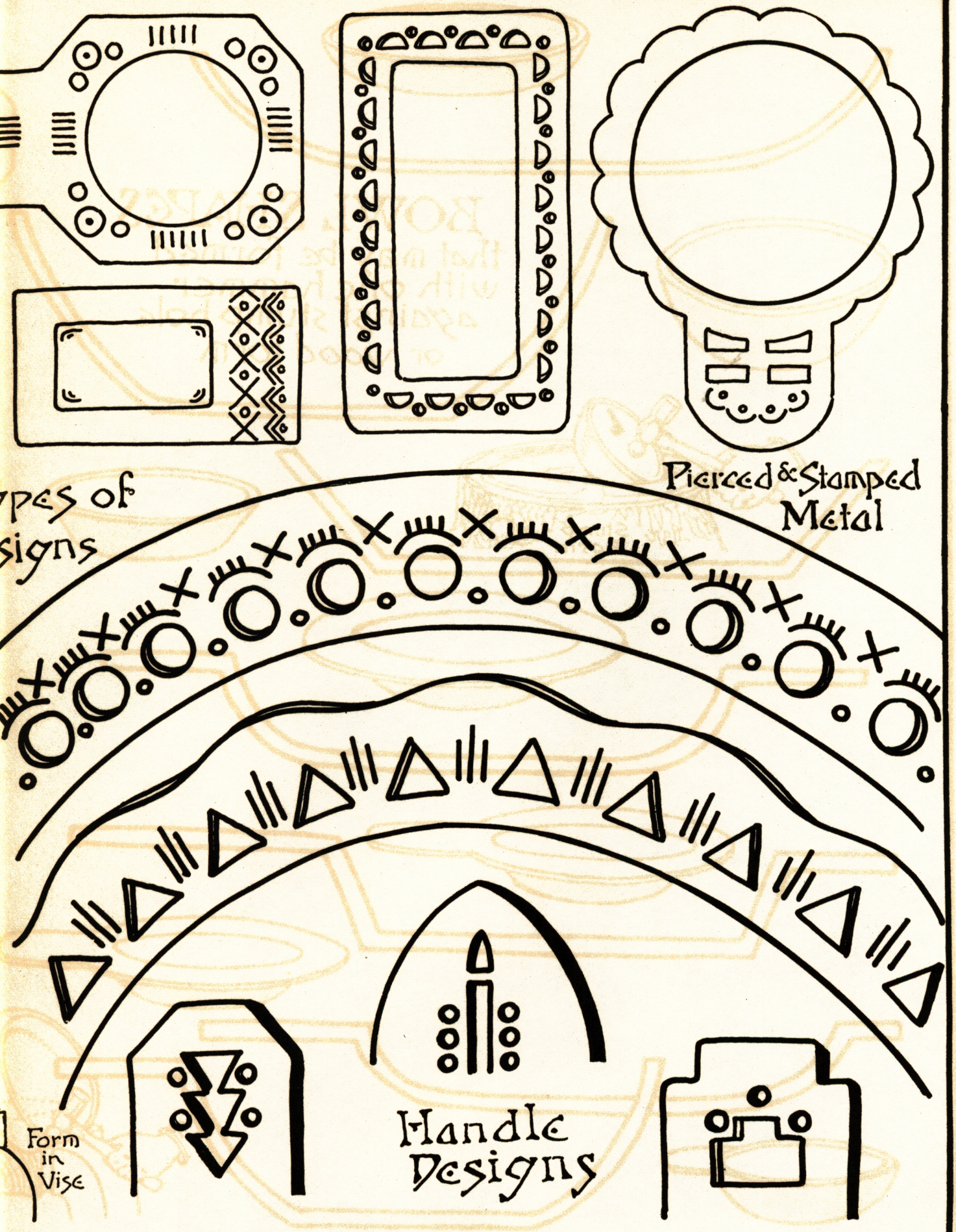
Art Metal Craft - Copyright 1937 by The Davis Press, Inc., Worcester, Mass. - Printed in U. S. A.

BOWL SHAPES

that may be formed with one hammer against stump hole or wood form



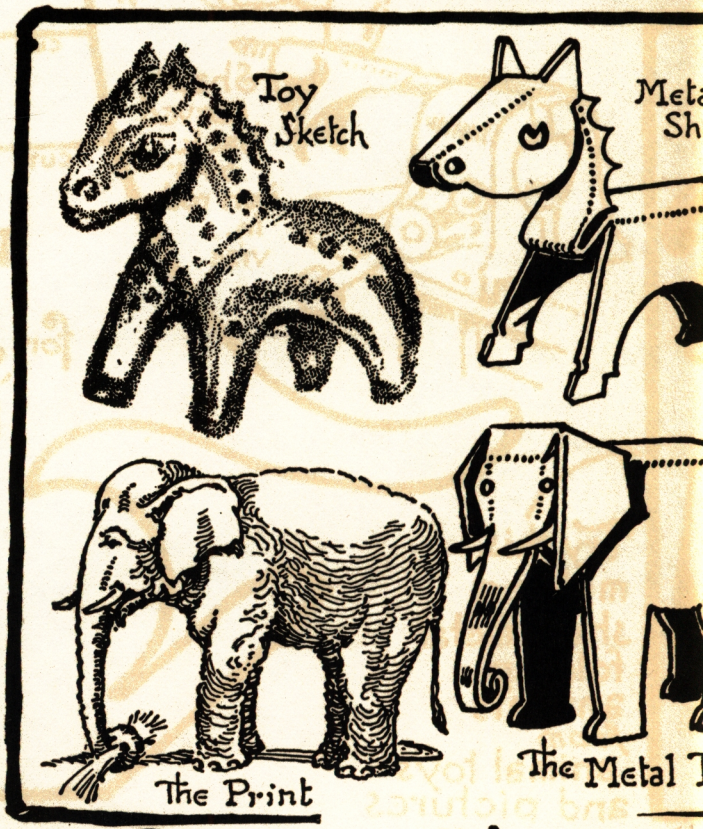


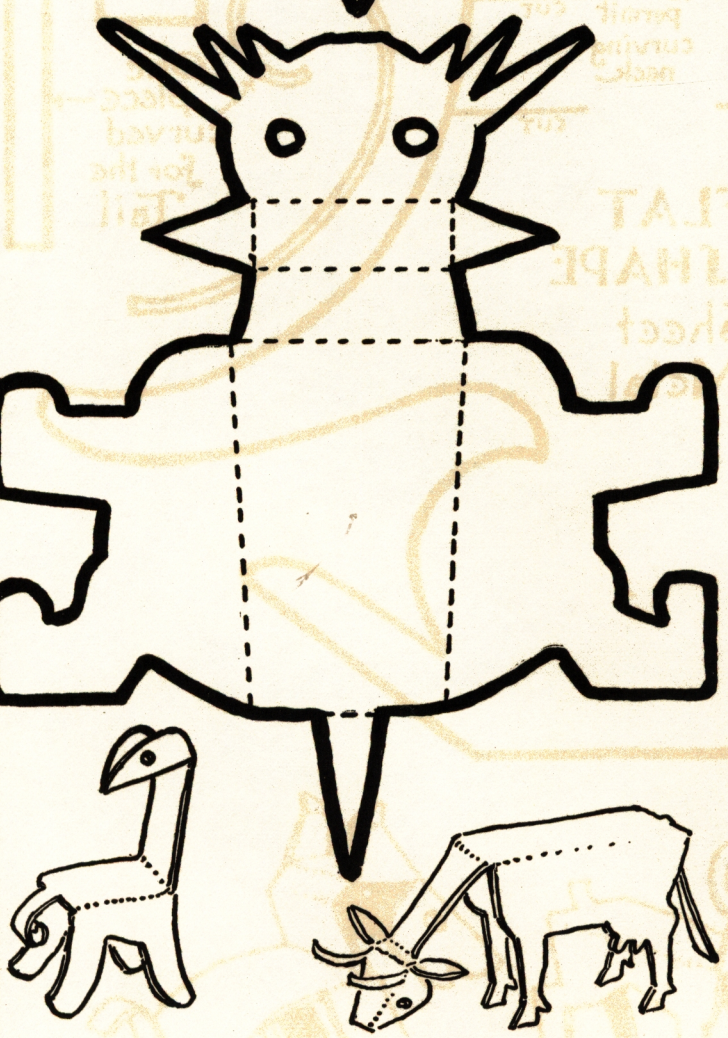


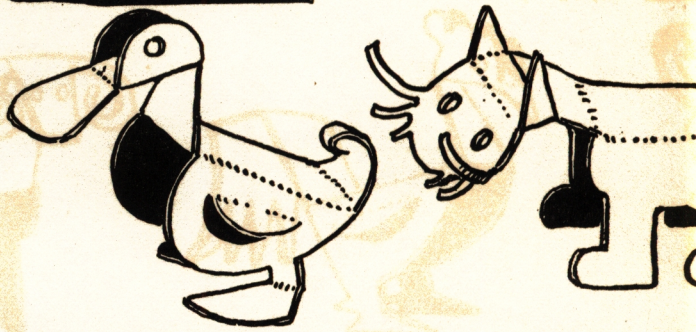
Art Metal Craft - Copyright 1937 by The Davis Press, Inc., Worcester, Mass. - Printed in U. S. A.

Types of shapes for Designing Other Creatures

SHEET METAL FOLD UPS

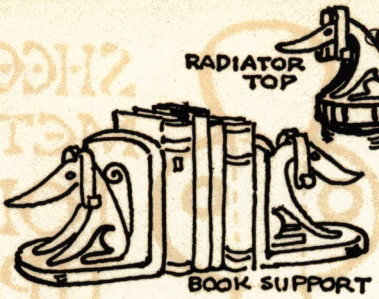


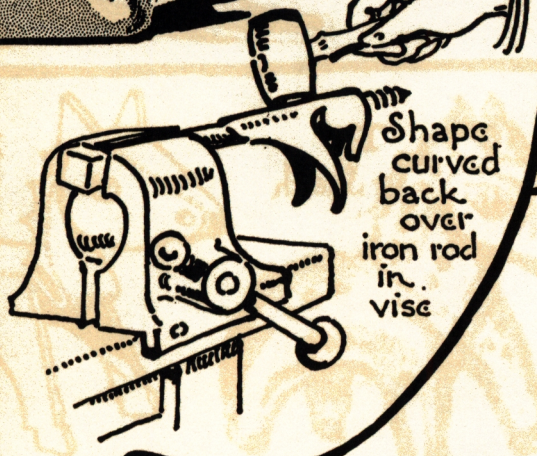




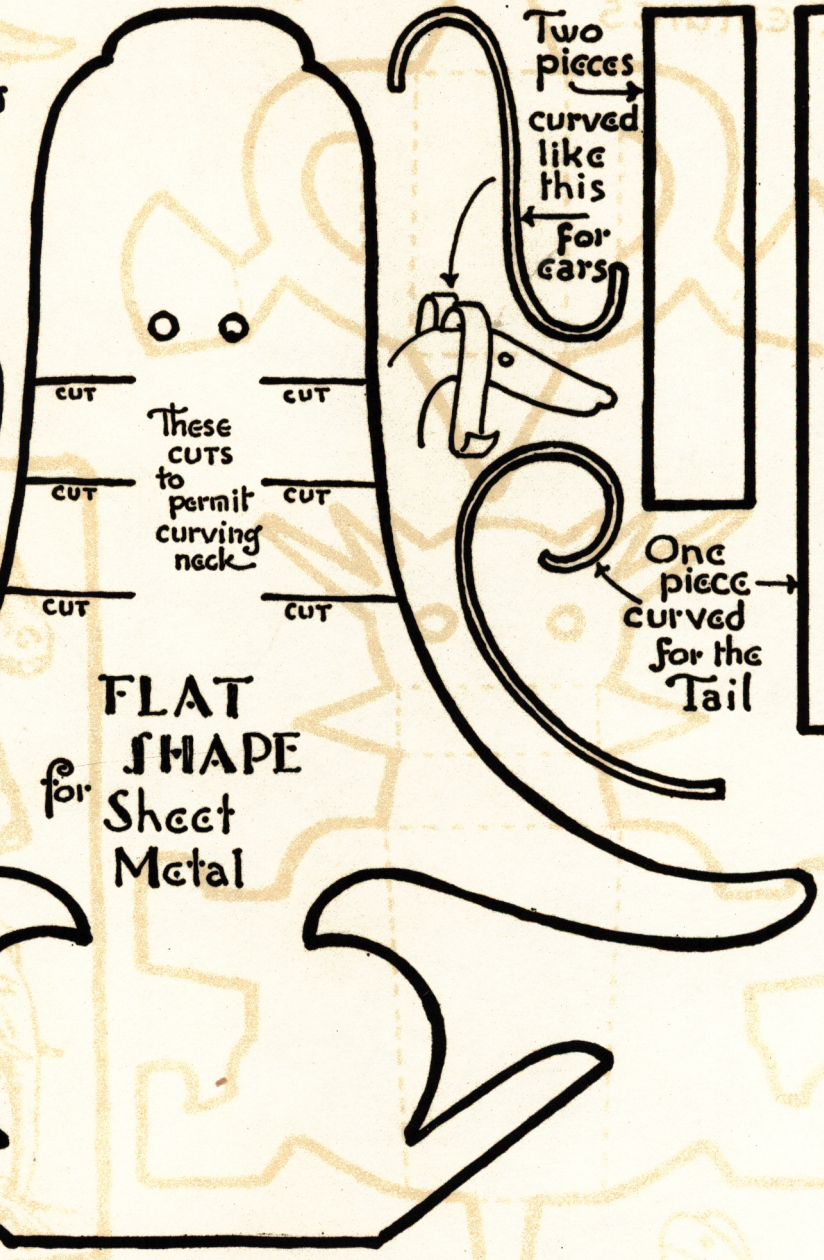
SCHNOZZLE DOG

may be used for many things





Shape curved back over iron rod in vise



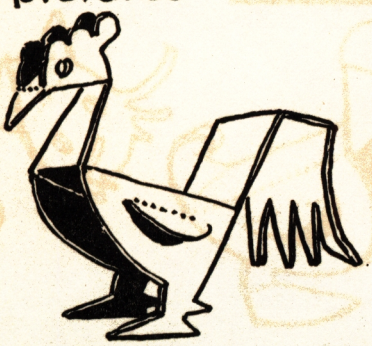
These cuts to permit curving neck

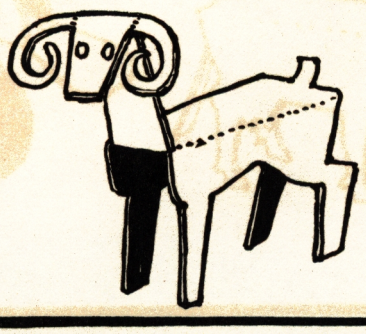
Two pieces curved like this for ears

One piece curved for the Tail

FLAT SHAPE for Sheet Metal

Try this, making sheet metal fold-up animals *from* animal toys and pictures





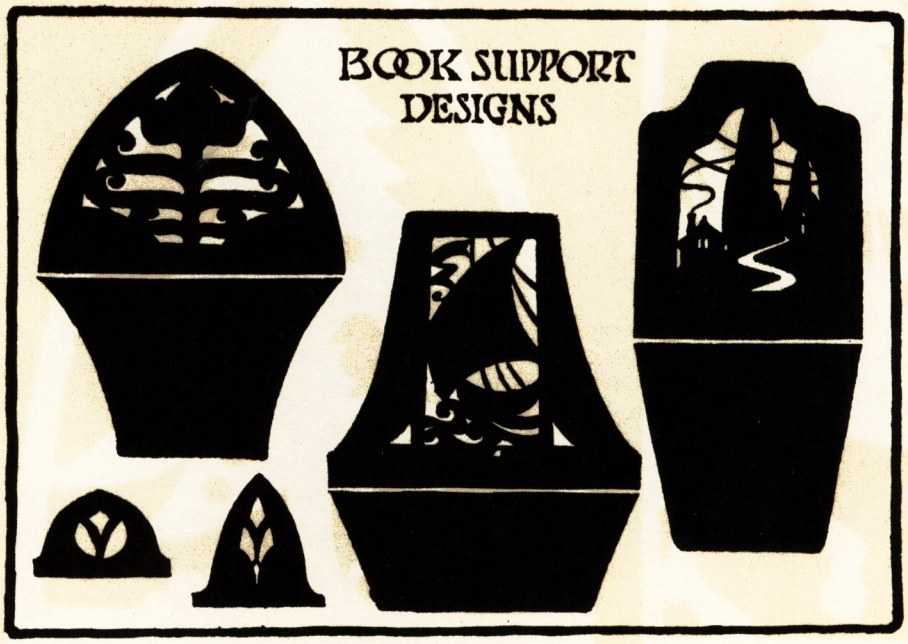
Art Metal Craft - Copyright 1937 by The Davis Press, Inc., Worcester, Mass. - Printed in U. S. A.

Using a Sketch for Metal Craft

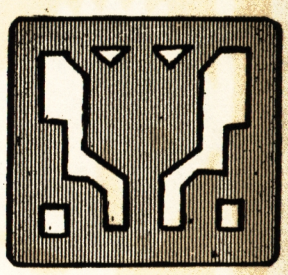
The Sketch

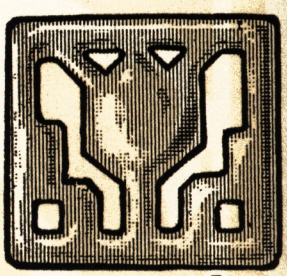
The Subject in Metal Parts

The Subject in Open Parts

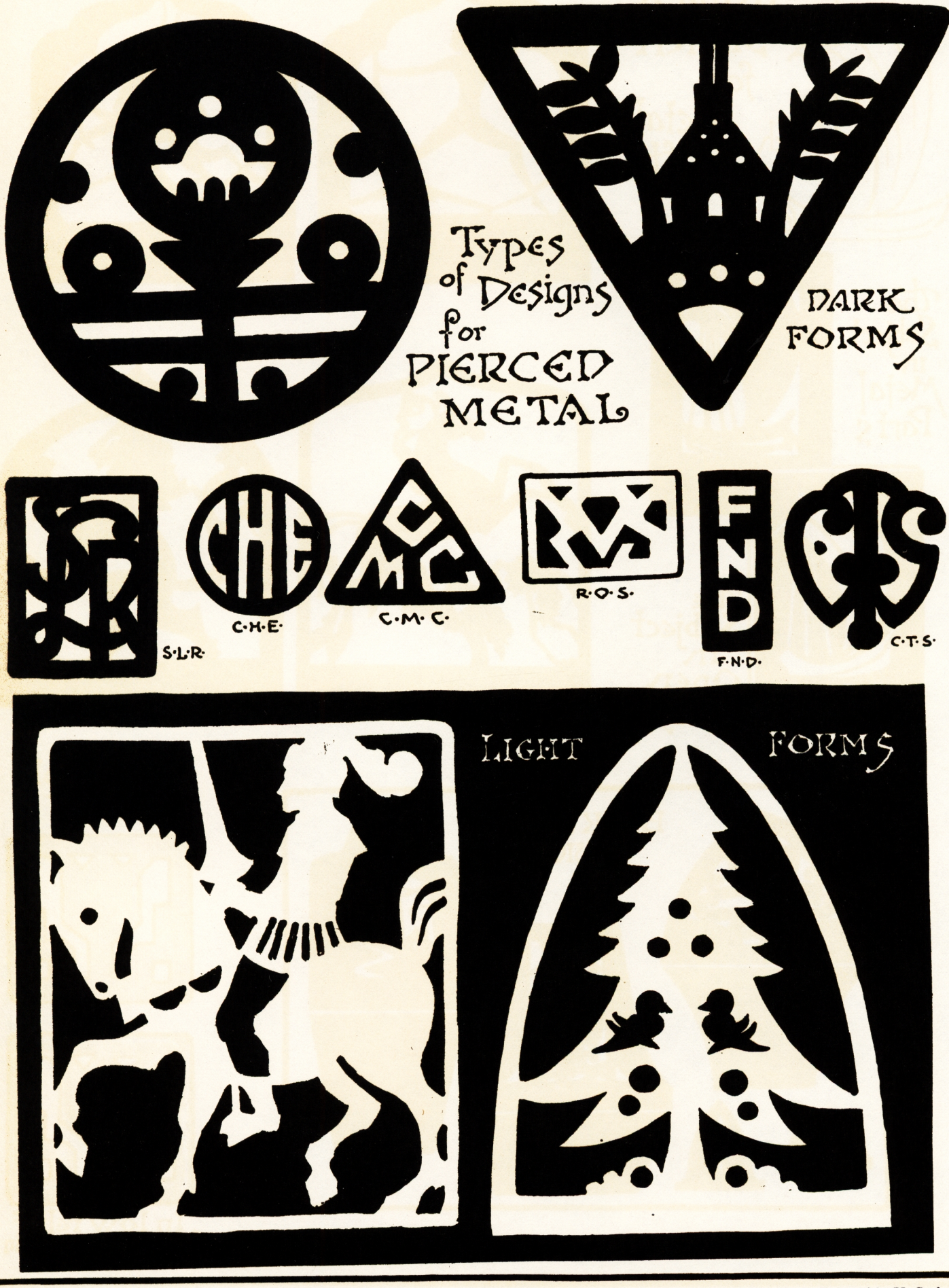


The metal left flat





In low relief hammered from the back



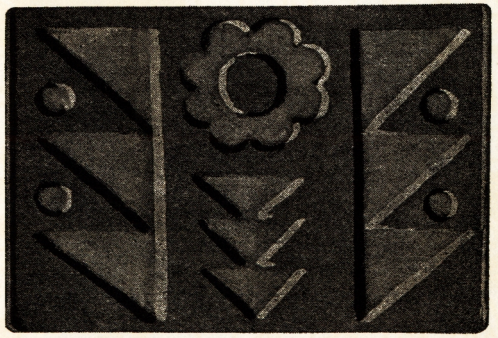
Art Metal Craft - Copyright 1937 by The Davis Press, Inc., Worcester, Mass. - Printed in U. S. A.

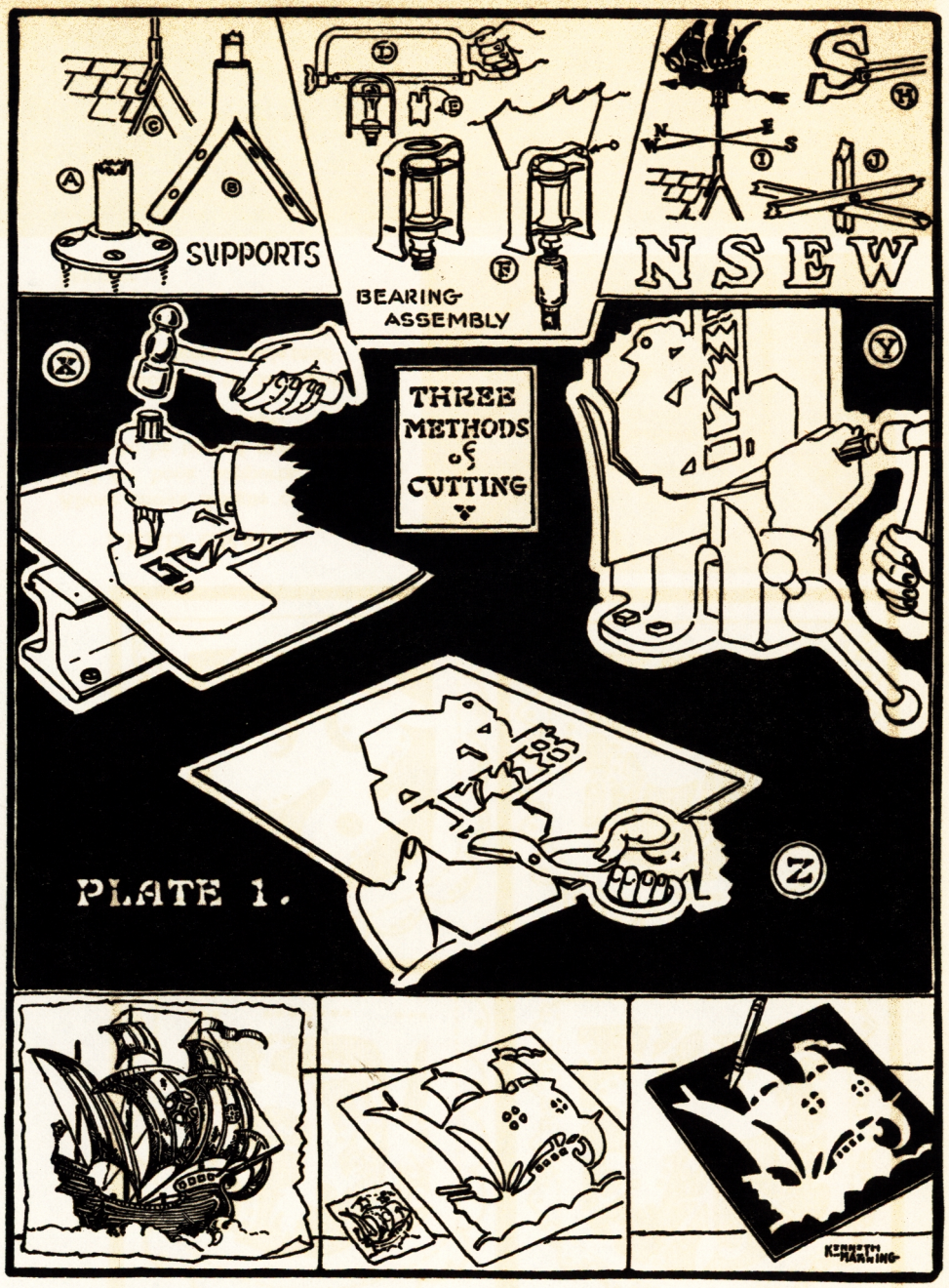
Copper or brass wire together with thin sheet brass or copper produces interesting metal craft

LEAD CRAFT

Above shows designs cut in lead for book supports, the edges to be turned over and nailed to a wood shape.

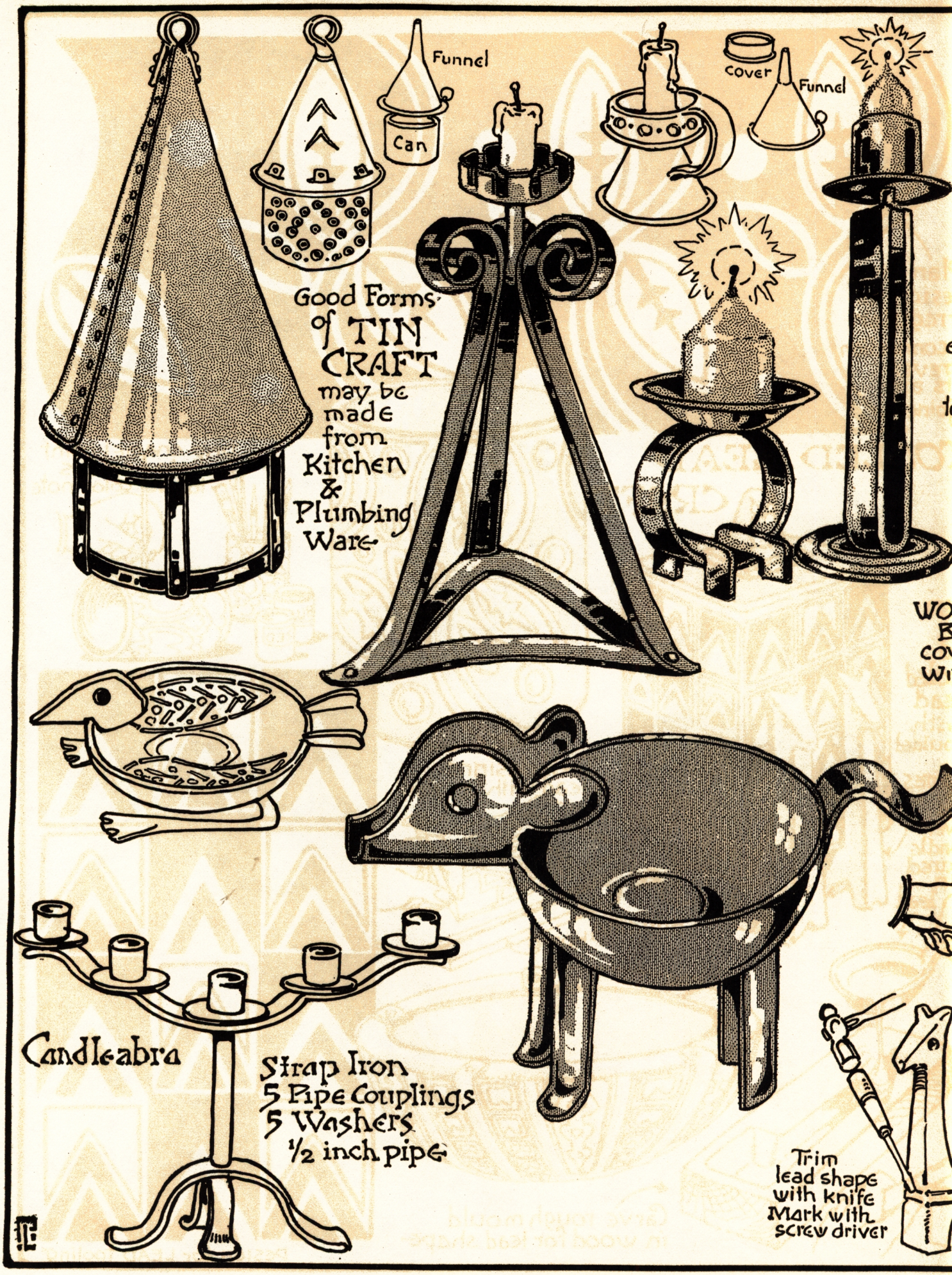
The illustration to the right and below shows panels modelled in lead with tools made from nails tapped with a hammer.

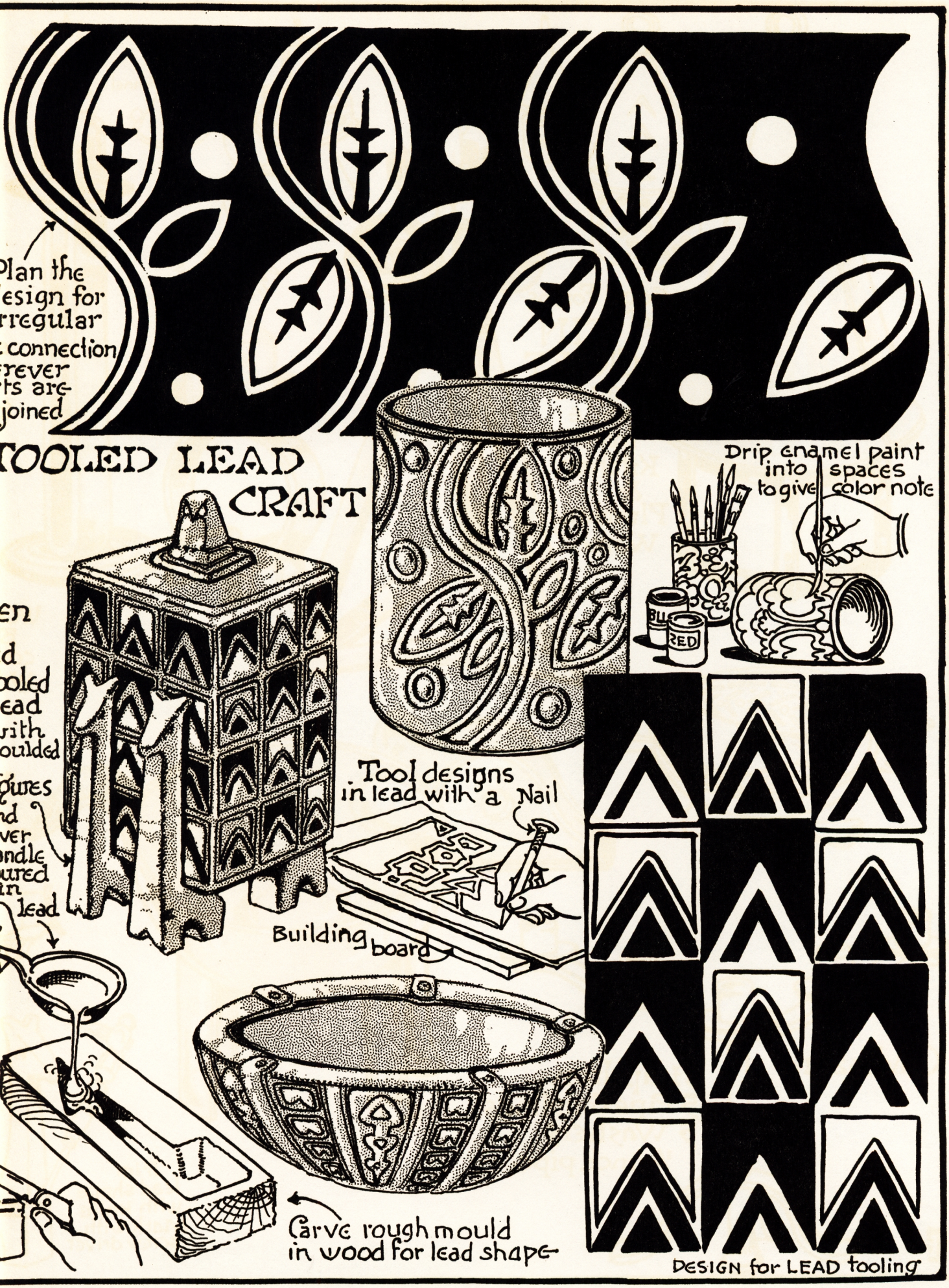




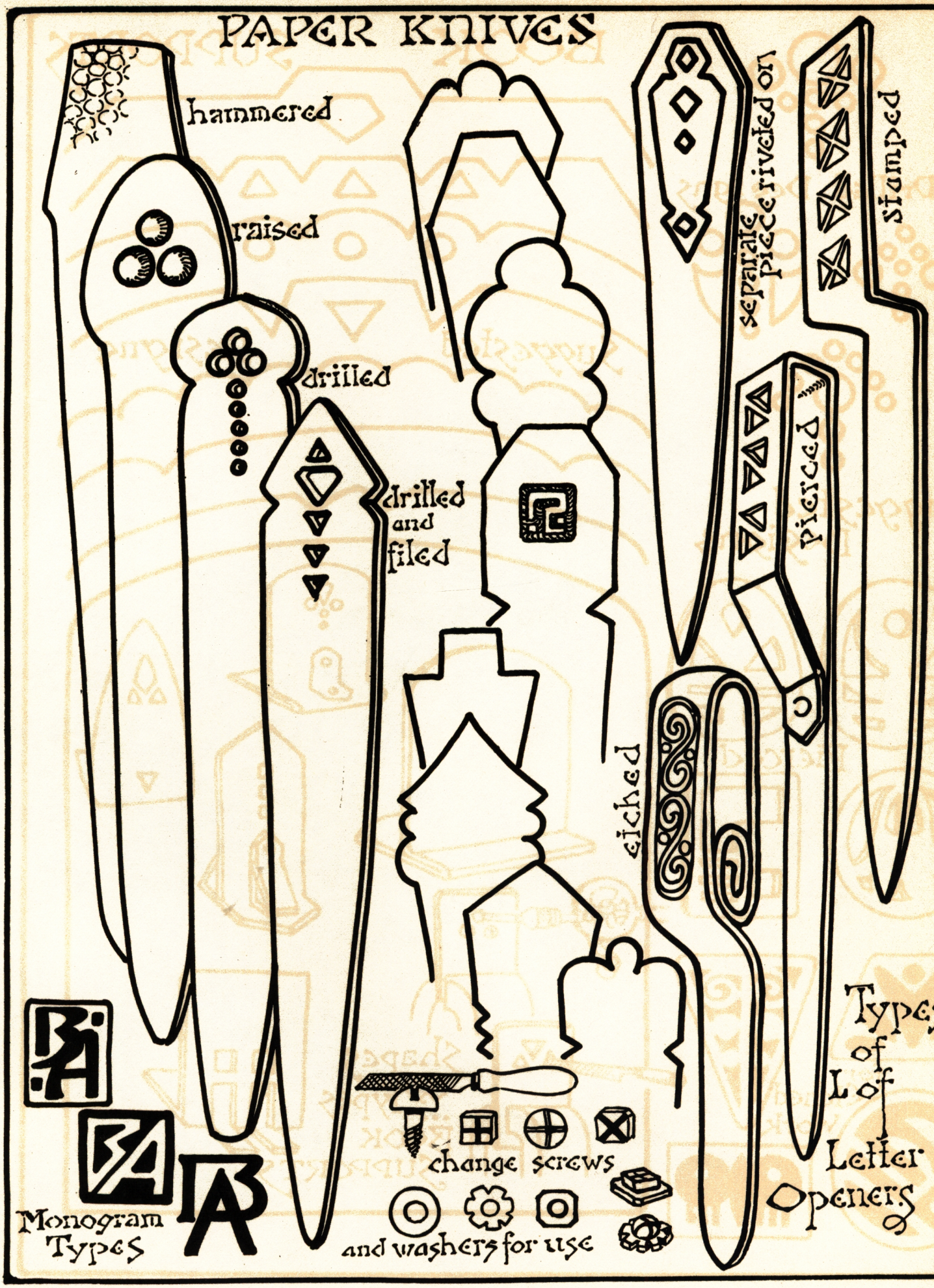
Sheet iron weather vanes may be easily made

Art Metal Craft - Copyright 1937 by The Davis Press, Inc., Worcester, Mass. - Printed in U. S. A.


Funnel
Can
Cover
Funnel
Good Forms of TIN CRAFT may be made from Kitchen & Plumbing Ware
Candleabra
Strap Iron
5 Pipe Couplings
5 Washers
½ inch pipe
Trim lead shape with knife Mark with screw driver



Art Metal Craft - Copyright 1937 by The Davis Press, Inc., Worcester, Mass. - Printed in U. S. A.


PAPER KNIVES
hammered
raised
drilled
drilled and filed
separate piece riveted on
pierced
stamped
etched
change screws
and washers for use
Monogram Types
Types of Letter Openers

BOOK SUPPORTS

Art Metal Craft - Copyright 1937 by The Davis Press, Inc., Worcester, Mass. - Printed in U. S. A.